infer from these observations that, so far as this village population was concerned, it made no difference to the foetus whether the mother's serum reaction was positive or negative.

Dr. Hudson described the extensive series of Kahn and other tests, which were carried out on a total of 4,472 samples of blood in 5 months. An enormous amount of work was done by the serologists, and for help they had only untrained boys who had to be taught how to wash glassware and perform similar activities. Dr. Tuomioja of Finland, the chief serologist, reported that among his positive reactions he obtained a larger proportion of low titres than would be expected in a series of syphilitic patients. It was not possible to see any difference in the serological results whether the blood samples were taken in a malarious area or not.

As for leprosy, the Government policy was to segregate lepers. The team came upon a few who were still at large, but the number encountered was not large enough to be of importance in this series. It was interesting in this connexion to recall that in the Dark and Middle Ages the word " leprosy " was used as a generic term for chronic ulcerative disease and might well have included such manifestations as bejel. The team found an isolated town where to-day bejel is still called *jirdam*, the Arab name for leprosy. In another area bejel was called *lowath* (literal translation, unclean), reminding one of the ancient lepers with clappers and bells, crying " Unclean, unclean ! ".

Bejel was a disease which no one in Iraq had taken very seriously. Even those who had it often took it lightly. Most of the medical men of Iraq described it as " just syphilis " and usually regarded it as congenital in nature. The team found bejel to be common among the children of rural areas, the early muco-cutaneous eruption usually lasting about a year. Older people exhibited late lesions of gummatous nature, mostly in bones and skin, and complained of headaches, pains in the bones, ulcers, and disability. Though not a direct cause of death in many cases, bejel certainly caused a great deal of suffering, physical handicap, and economic loss. In the province of Dulaim with a total population of 193,000, the rural villagers numbered about 131,000. In the province of Amara with a population over 300,000, five-sixths of the people were rural. One might estimate conservatively that there were 250,000 people in the whole of Iraq who needed treatment for treponematosis, either bejel or venereal syphilis, and the number who were seropositive might be double that figure. If one went a little further and took in those now living who were going to have bejel at some time or other in their lives, the total figure might well be a million.

The ideal programme for the suppression of this disease would not be very difficult to set up. It was easy to diagnose, and treatment by penicillin was standardized as to dose and was practically free from danger of reaction. There were ways of getting around the obvious geographical difficulties. What was particularly needed were enthusiastic doctors, sufficiently scientific and humanitarian in outlook.

DISCUSSION

DR. R. R. WILLCOX said that it had been a singular pleasure to listen to Dr. Hudson because he himself had been concerned with the WHO Bejel Project at the early blue-print stage, since which time Dr. Hudson had been extraordinarily kind in sending him reports at regular intervals. In the letters accompanying these reports Dr. Hudson had said that he was " writing from the saddle ", but he had now come off it and had presented a most fascinating picture.

When Dr. Willcox visited Iraq he was struck by the frequency of angular stomatitis, and this to a considerable extent appeared to confuse the diagnosis. He was confronted with the same problem in Africa where he had seen njovera, an extra-venereal syphilis of Southern Rhodesia. In the njovera area, an angular stomatitis, presumably due to vitamin deficiency, was frequently labelled njovera by the native orderlies. The distinction between angular stomatitis and syphilitic lesions in the same site can only be made absolutely by means of the dark field, and he would value Dr. Hudson's views on that subject.

DR. G. M. FINDLAY said that everyone interested in endemic spirochaetal infections owed a debt to Dr. Hudson because of his insistence on the close relationship between all the various forms of treponematoses. It was, in fact, very difficult to draw a dividing line between bejel and yaws : they both had very similar manifestations which might involve the nose and the soles of the feet or the palms of the hands. Not very long ago in the middle of the 18th century there had existed a

similar non-venereal treponematosis in Scotland under the name of sibbens or sivvens, and non-venereal treponematoses of the bejel type were now known to exist in the Anglo-Egyptian Sudan and in Southern Rhodesia. Even in the United States of America an outbreak of syphilis transmitted non-venereally among children had been reported. It seemed that where social conditions were poor the treponematoses were invariably transmitted by other than venereal routes as well as in the usual way. The observation of Dr. Hudson that the rural inhabitants of Iraq did not distinguish between bejel and leprosy was of great interest, for there was considerable evidence to show that in Western Europe, before the discovery of America by Columbus, what was termed " leprosy " was commonly regarded as a venereally-transmitted disease. This belief was epitomized in " The Testament of Cresseid ", written in the 15th century by the Scottish poet, Robert Henryson.

Dr. Hudson had said little about treatment apart from the routine use of penicillin. When in 1943 home-made penicillin was first used for the treatment of secondary yaws in the Gold Coast, the results had been extraordinary, despite the low antibiotic content of the material injected. Later observations with more highly purified penicillin had confirmed and extended these original findings. In addition to penicillin, which is best given by injection, there were now available for treatment of endemic treponematoses the antibiotics, chloramphenicol, aureomycin, and terramycin, all of which were active when given orally. At the present time, in the forest region of the Gold Coast, a large scale scheme was in operation to test the effects of aureomycin in the treatment of yaws. Aureomycin also had the advantage of rapidly clearing up all the tropical ulcers which, together with yaws, formed the most widespread cause of ill-health in the tropics. Later on, it was hoped to carry out a similar large-scale experiment with terramycin, which, while having the same curative action as aureomycin, was possibly less toxic and less liable to cause nausea, diarrhoea, and vomiting.

DR. GLADYS HOBBY said that terramycin had been used by Dr. Arthur Schoch of the Southwestern Medical Foundation in Dallas, Texas, in about forty patients with syphilis, with encouraging results. Dr. Elmer Loughlin had obtained excellent results with it in the treatment of yaws. His observations were reported in a recent issue of a new journal now being published in the U.S.A., under the title *Antibiotics and Chemotherapy*. The results in the treatment of tropical ulcers recently reported by Dr. Findlay and his associates, were most interesting and encouraging. They did not yet know exactly how active terramycin was against the spirochaetes, but she was sure that the M.S.S.V.D. and Dr. Findlay in particular would have much say about that in the near future.

DR. C. J. HACKETT said that in an area where yaws was practically universal he thought that of those tested in the adult population between the ages of 18 and 40 or 50, 80 per cent. would be found to be serologically positive. He added that he still found it difficult to visualize exactly what bejel was like. In Uganda, in syphilitic areas, in Kampala particularly, the picture was very characteristic, and one saw large numbers of young adults with primary or secondary syphilis, while in yaws areas there were large numbers of children with widespread characteristic granulomatous lesions. Congenital infections were not frequent in the former and were not observed in the latter. He could not comprehend bejel in the same way, and he would be grateful if Dr. Hudson could give some idea of the disease as a whole, and whether cases tended to relapse.

COLONEL L. W. HARRISON raised the question of the transmission of the disease to the next generation. Dr. Hudson had mentioned a comparison between sero-positive and sero-negative cases in respect of miscarriages ; he would like to have a comparison between miscarriages occurring in those people who had contracted bejel late in life, near to the child-bearing age, and those in uninfected persons, and further, what the incidence was of congenital stigmata. He thought that the natural tendency of people suffering from syphilis to become sero-negative had been recognized almost from the beginning.

DR. DAVID NABARRO said that for many years he had been interested in congenital syphilis, and that recently, on going through his records, he had been surprised to find the number of cases which appeared to him to be acquired and not really congenital in origin. This might have a bearing on the symptomatology of the condition. There were 44 cases of acquired syphilis which he had thought in the first instance to be congenital, but in which careful investigation had revealed various features which put one upon the right track and showed that the disease had been acquired. All these acquired cases had negative cerebrospinal fluids. Children with the congenital condition did not as a rule get jaundice from arsphenamine treatment, but the patients with acquired syphilis did, and by this process of working out the history of the cases he had been able to collect more than forty cases of children who were at first wrongly thought to have congenital syphilis.

Practically all these cases had failed to show early infantile symptoms, and none showed a primary lesion. In this respect they resembled the bejel patients described by Dr. Hudson.

DR. HUDSON said in reply that many of the points raised in the discussion had puzzled them in the field and were still puzzling them. They had not yet found the answers. As to treatment—they used penicillin in the form of PAM and their dosage was 1·2 million units, which was 4 ml. If a child was not too small he was given the full amount; adults were given from 4 to 6 ml. They seldom saw any patient more than once, and it was hard to get a case back again, even if the team made a second visit to the same place. Yet there had been cases, for example, in some schools, where the team was able to return after some time; they had found that the number of sero-reversals had been very small even when large amounts such as 9 or 10 million units of penicillin had been given. It was their feeling that the check was made too soon after the initial treatment. Sero-reversal was not a practical objective in a mass campaign; they might as well let people keep their positive serum reactions so long as they did not have signs and symptoms, and particularly open lesions.

Someone had referred to the "low percentages" of sero-positivity. It was true that in comparison with yaws, the figures for bejel seemed low. An attempt had been made in this case to be as conservative and non-sensational as possible; more detailed studies would probably justify larger percentages. Perhaps another factor was that in some regions some patients had had a few injections of bismuth.

Bejel was certainly linked with poor village sanitation, and since in some parts of Iraq there had been improvement in this respect, he thought that the disease was not so common as it had been. He had not been able to go into the symptomatology of the various stages of the disease owing to lack of time. Cases of tabes had been described in Baghdad, and a good deal of angular stomatitis had been found, especially among children, the significance of which was still in doubt. He wondered whether it could be related to an avitaminosis, or conceivably to bejel lesions of the mouth.

Dr. Turner of Johns Hopkins University in Baltimore had sent over some rabbits and hamsters, and two rabbits had been inoculated with spirochaetes from two primary lesions acquired venereally in Baghdad. These strains were now established in Baltimore. Another set of rabbits was inoculated in the marsh area with spirochaetes from children with bejel, and at least one strain had been established. The Baltimore laboratory, which was working in collaboration with WHO, proposed to compare these strains in various ways with each other, and with strains from other parts of the world.

The question whether bejel was a congenital infection or an acquired disease of childhood was one which the team always bore in mind. If a woman had had the infection only a short time before her confinement she would be more apt to transmit the disease to her offspring, but owing to the fact that so many of these women had had bejel in childhood the opportunity for congenital transmission was reduced. Cases had been seen where the mother had bejel during her pregnancy and the child was born with a rash. It was tentatively concluded that congenital transmission was possible, but rare, in the environmental pattern of bejel. The ordinary congenital stigmata were conspicuously absent; these children had wonderful teeth and good facies.

Enough information had now been collected to plot out a curve relating age to sero-positivity, but this had not yet been done. The curve would probably rise steeply from the first year to perhaps 20 years of age, and thereafter fall much more gradually, without ever approaching the base line.

He thanked those who had taken part in the discussion and also the President for her kind words of welcome. A vote of thanks was accorded to Dr. Hudson and the meeting terminated.